



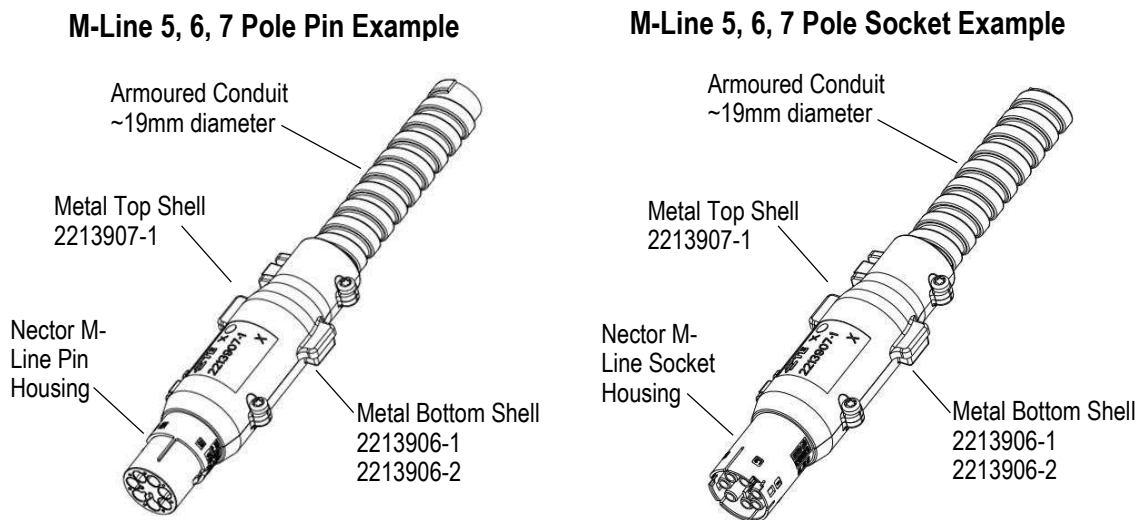
NOTE

All numerical values are in metric units [with U.S. customary units in brackets]. Dimensions are in millimeters. Unless otherwise specified, dimensions have a tolerance of $\pm 0.1\text{mm}$ and angles have a tolerance of $\pm 2^\circ$. Figures and illustrations are for identification only and are not drawn to scale.

1. INTRODUCTION

This specification covers the requirements for application of M-line 5, 6, 7 Pole Metal Shells used in conjunction with Nector X-Line 5, 6, 7 pole connector system to allow connection to an armoured conduit system. The metal shell system is available for use with two wire gauges. The metal shell system is intended for use with individual wires. The armoured conduit system consists of two metal shells, an internal contact post for connecting CPC to shell, a system to allow an insulated metal band to hold the wires to reduce strain on the connector contacts at installation and features to locate the armoured conduit.

When corresponding with personnel, use the terminology provided in this specification to facilitate inquiries for information. Basic terms and features of this product are provided in Figure 1.



Metal Bottom Shell Part number	FOR WIRE SIZE (mm ²)	WIRE TYPE	CONNECTOR POLES
2213906-1	1.5mm ²	BS7211	5, 6, 7
2213906-2	2.5mm ²	BS7211	5, 6, 7

Metal Top Shell Part number	FOR WIRE SIZE (mm ²)	WIRE TYPE	CONNECTOR POLES
2213907-1	1.5mm ² - 2.5mm ²	BS7211	5, 6, 7

Figure 1

1.1. Ratings

1.1.1 Voltage / Current: 400 V AC / current rating according to table 1 below

Nominal cross-sectional area (mm ²)	Single phase circuit (2W. loaded max.) Current max.	Multiphase circuit (2W. loaded max.) Current max.
1.5	16A	10A
2.5	20A	16A

Table 1

1.1.2 Operating temperature:

According to IEC 61535 installation couplers are suitable for use at ambient temperature not normally exceeding +40°C, but where the average temperature over a period of 24h does not exceed +35°C.

2. REFERENCE MATERIAL

2.1. Revision Summary

Initial release of application specification

2.2. Customer Assistance

Reference Product Base Part Number 2213906 and 2213907 and Product Code K681 are representative of Metal clad system connector for Nector M-Line couplers. Use of these numbers will identify the product line and help you to obtain product and tooling information when discussing with TE Industrial Intelligent Buildings business unit engineering.

2.3. Drawings

Customer drawings for product part numbers are available online at www.te.com. Information contained in the customer drawing takes priority.

2.4. Specifications

108-133079	Product Specification Metal Shell NECTOR M-line 5-, 6-, 7 provides product performance and test results.
107-133079	Product packaging specification Metal Shell NECTOR M-line 5-, 6-, 7
108-20324	Product Specification NECTOR M-line 5-, 6-, 7-Position Standard Connectors
114-20169	Application Specification NECTOR M-line 5-, 6-, 7-Position Standard Connectors
501-19240	Qualification Test Report: Metal clad system connector for Nector M-Line

3. REQUIREMENTS

3.1. Storage

A. Shelf Life

The product should remain in the shipping containers until ready for use to prevent damage to components. The product should be used on a first in, first out basis to avoid storage contamination that could adversely affect performance.

3.2. Preparation

The system accepts copper stranded wire having the sizes and types as listed in table 3.

The wire must be clean and free of contaminates, such as metal shards or other substances that can compromise the insulation diameter.

Pre-cut lengths of heatshrink to be kept in sealed containers/bags to avoid contamination

3.3. Materials

- ♦ Metal shells zinc die-cast with nickel plating (see table 2)

Item Ident	TE PN	Description	Qty
1	n/a	Universal fixture M or X Line assembly	1
2a	2213906-1	M-Line bottom shell for use with 1.5mm/□	1
OR			
2b	2213906-2	M-Line bottom shell 2.5mm sq/□	1
3	2213907-1	M-Line top shell	1

Table 2

- ♦ Wire types for use in system (see table 3)

Wire manufactured in accordance with	Conductor cross section (mm ²)
BS7211	1.5
BS7211	2.5

Table 3

- ♦ Fasteners used with listed wire sizes (see table 4)

Item Ident	Description	Qty
1	M3 x 8mm TriTap DIN 7500 PE(CT) T10 Torx	4
1.5mm² wire size		
1	M4 x 8mm TriTap DIN 7500 PE(CT) T20 Torx	1
2	M4 Spring Washer SS	1
3	M4 Plain Washer SS	1
2.5mm² wire size		
1	M4 x 8mm TriTap DIN 7500 PE(CT) T20 Torx	1
2	M4 Spring Washer SS	1
3	M4 Plain Washer SS	1

Table 4

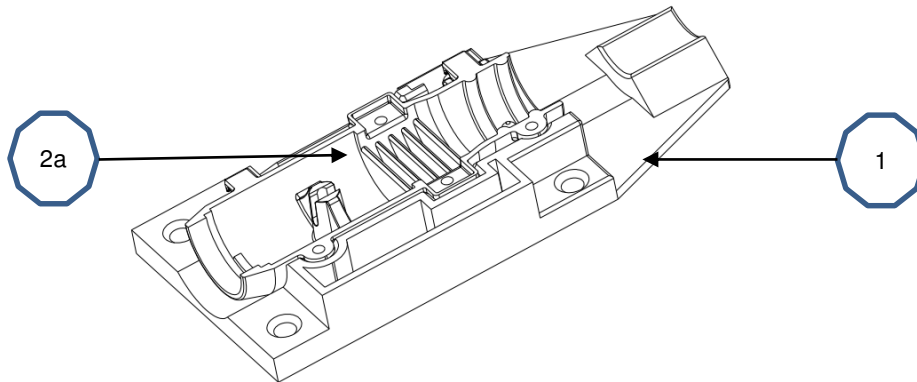
- ◆ Miscellaneous parts used with all wire sizes (see table 5)
- ◆ Heatshrink tubing for retention band; I.D supplied 6mm General purpose polyolefin
- ◆ Heatshrink tubing for wire; I.D supplied 15.3mm General purpose polyolefin

Item Ident	Description	Qty
1	Fixing band with 22mm length of 6mm diameter polyolefin heatshrink tubing added	1
2	18mm length of 13.72mm diameter polyolefin heatshrink tubing	1
3	Metal Conduit at "x" metres plus 200mm cable tails both ends	1
4	No.2 Busing	1

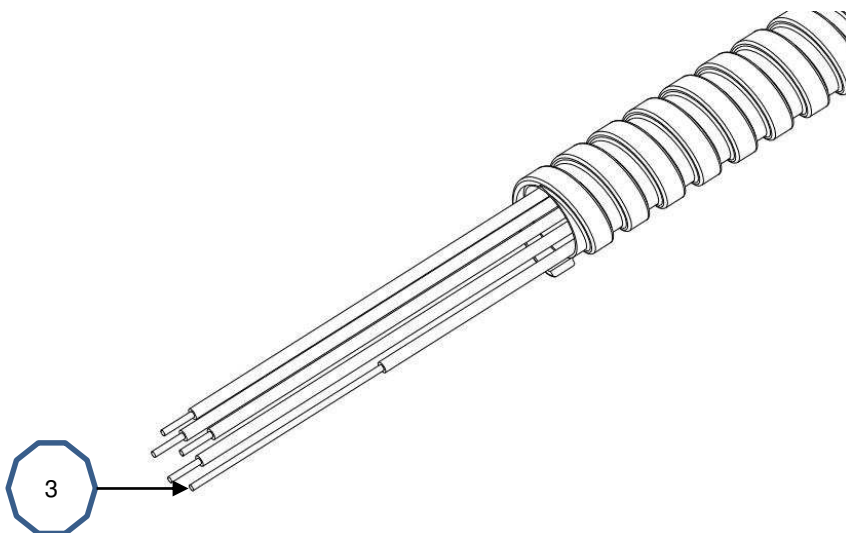
Table 5

3.4. Assembly

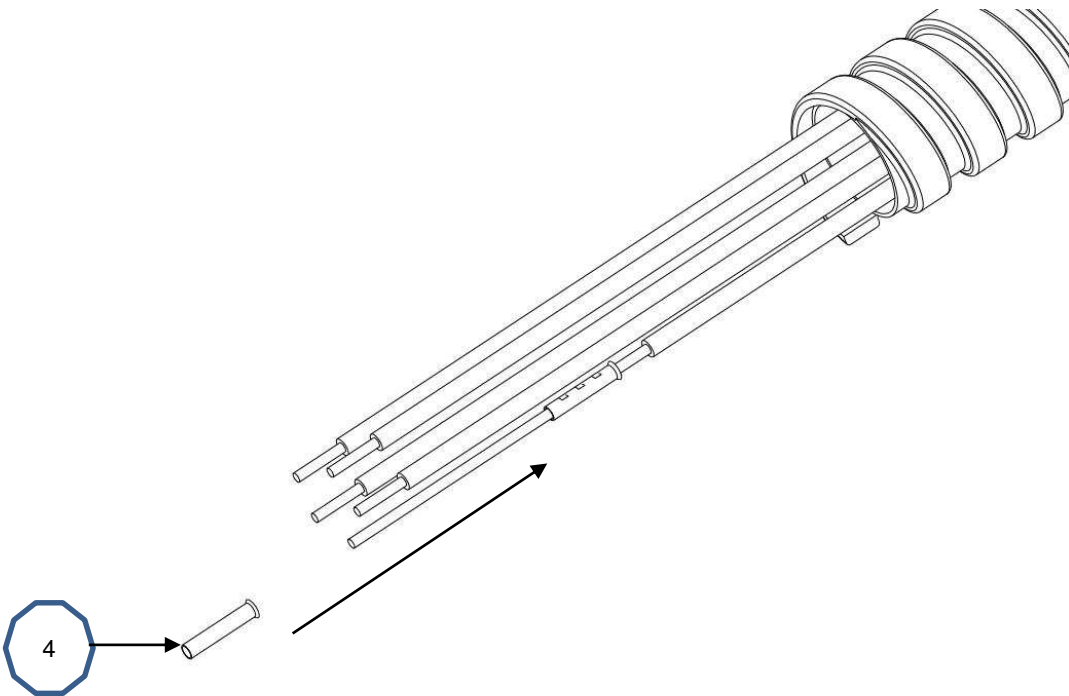
- Take bottom shell part number 2213906-1 for 1.5mm square wire (Item 2a) or bottom shell part number 2213906-2 for 2.5mm square wire (Item 2b).
- Place bottom shell in fixture (item 1 TE example only) to secure shell from excessive movement during assembly process as shown below.



- Collect required length of metal clad conduit with wires (length as required) protruding approximately 100mm from both ends of conduit. Tail length can be altered to suit customer ease of assembly.
- Prepare wires for crimping by stripping insulation. Refer to Nector M-Line 5, 6, 7 application specification document number 114-20169 for strip lengths all wires except CPC (earth) wire. Summary: strip 7.0mm and trim length at 5.0mm.
- For CPC only Earth (see item 3) strip 45mm of insulation from wire and crimp contact (Pin or socket depending on polarity of coupler).

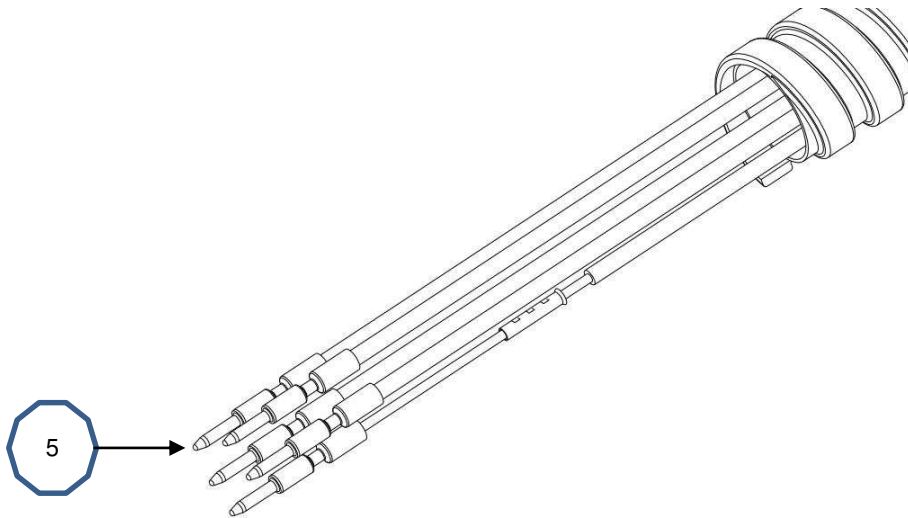


- Slide an appropriate sized uninsulated bootlace ferrule (see item 4) over the CPC conductor. Crimp onto conductor 3mm from start of wire insulation (note if required/preferred crimp the socket/pin contacts before the bootlace ferrule to keep conductor strands bound together).

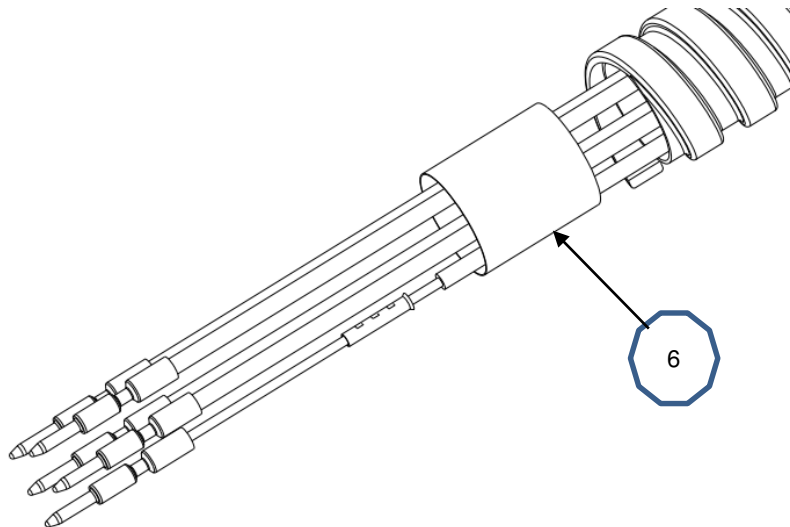


For CPC wire size mm/□	Use bootlace ferrule size mm/□
1.5	1.5
2.5	2.5

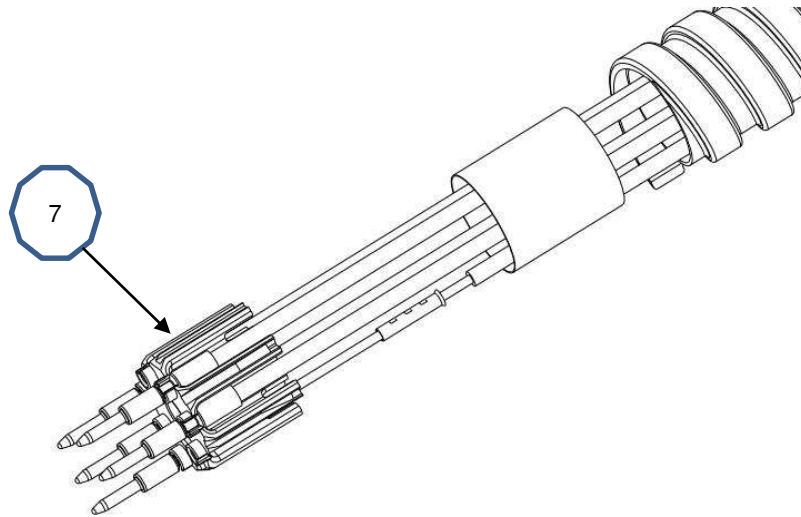
- Crimp contacts PIN or SOCKET (item 5) to wires using semi-auto crimping machine using settings and crimp quality checks as defined in 114-20169.



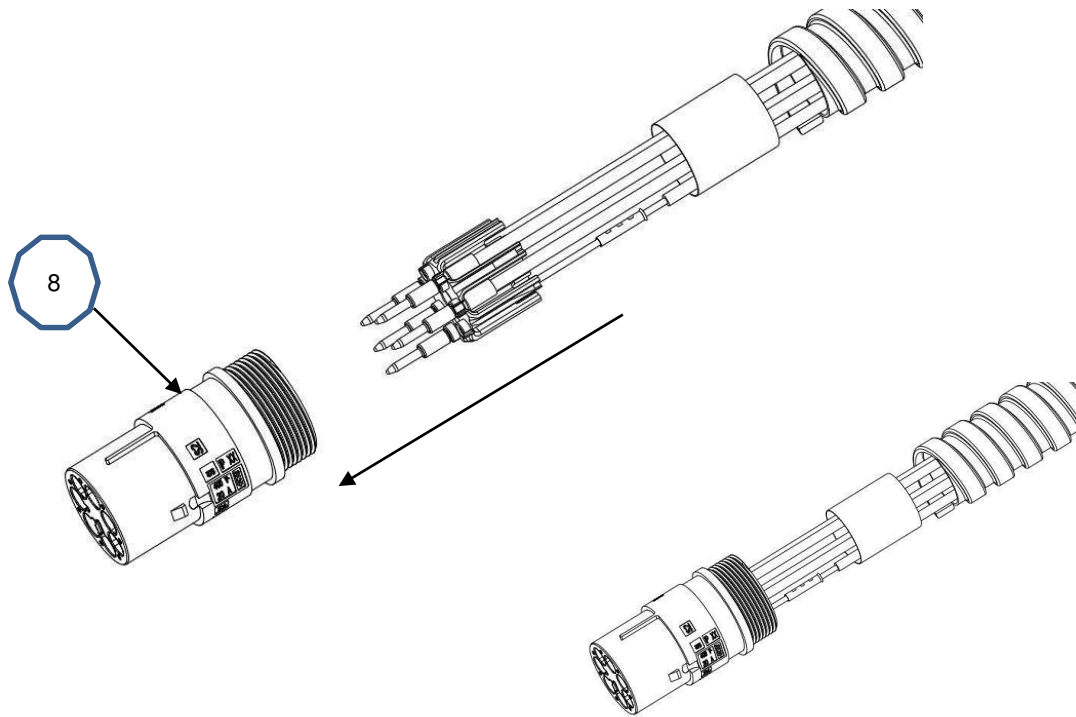
- Slide cut length (18mm) of 13.72mm diameter heat shrink (item 6) over crimped wires.



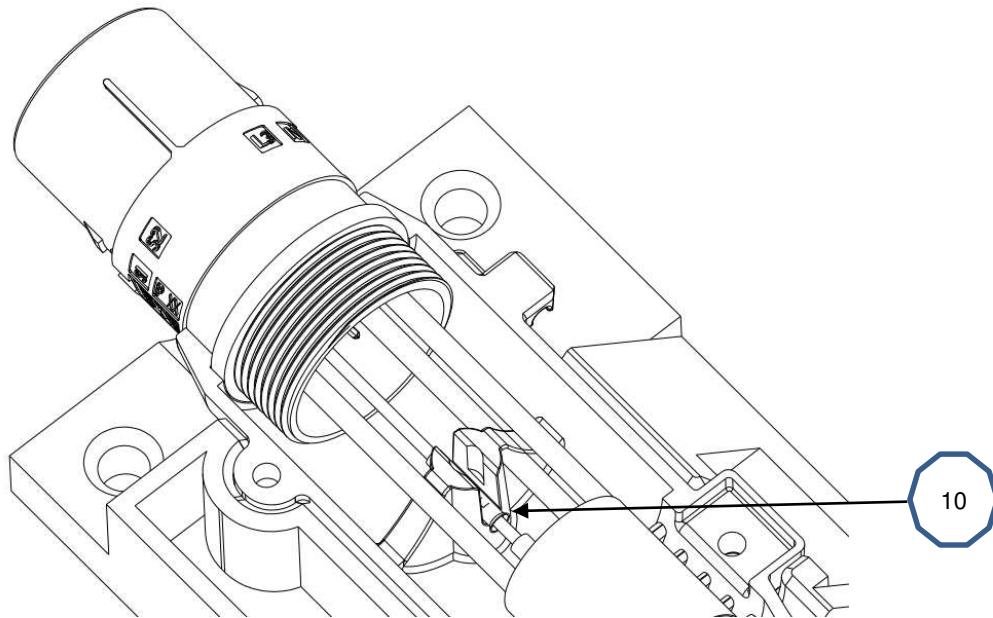
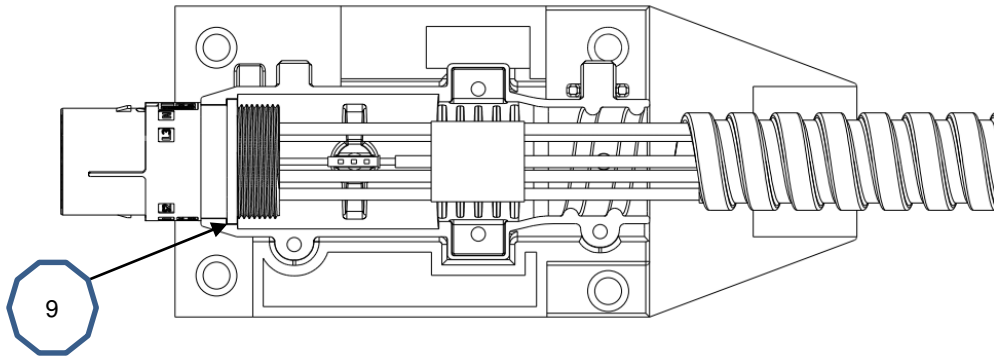
- Assemble Nector M-Line 5, 6, 7 pin or socket contacts to contact retainer 293658-1 (item 7)



- Assemble contact retainer assembly to Nector M-Line 5, 6, 7 housing (item 8)

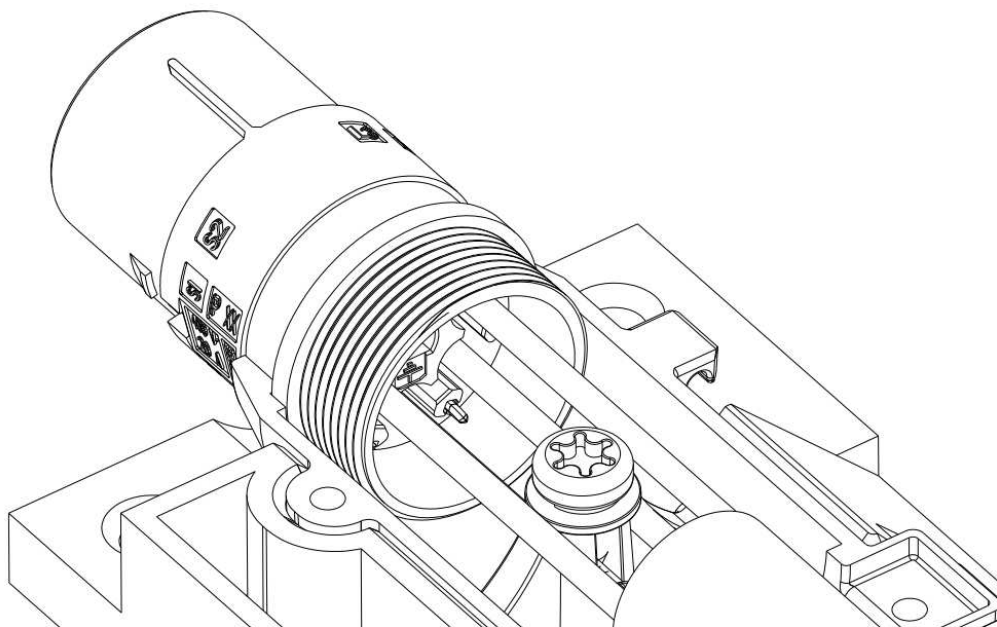
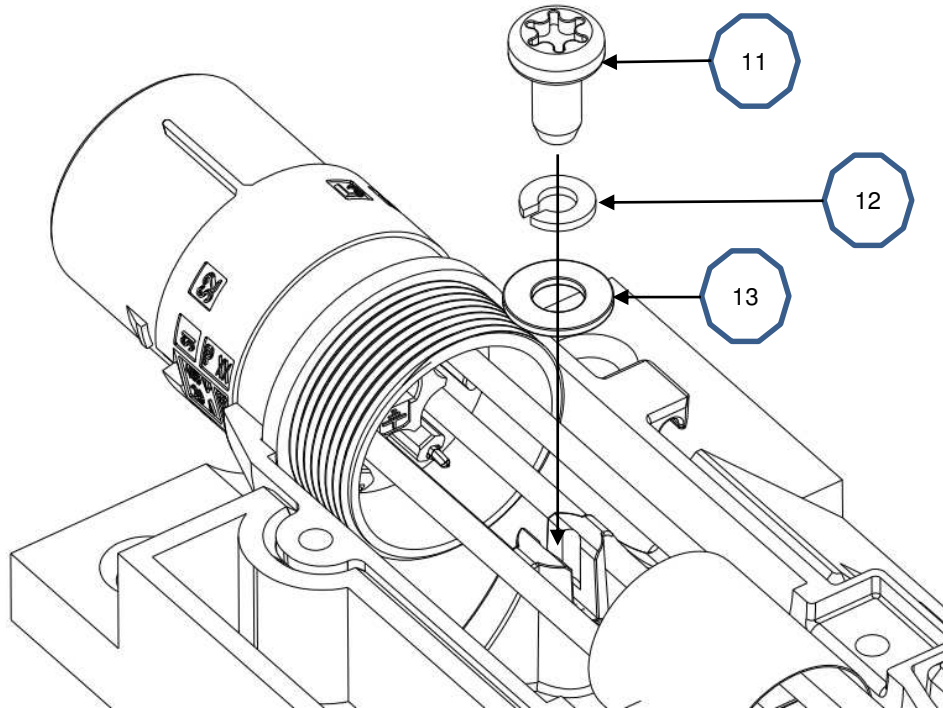


- Align Nector M-Line 5, 6, 7 assembly to metal shell with CPC (Earth) at 6 O'clock position. Note at this stage the metal clad conduit can sit behind the metal shell and does not need to be in final position. Connector housing will be held in general alignment by feature located in metal shell (see item 9).

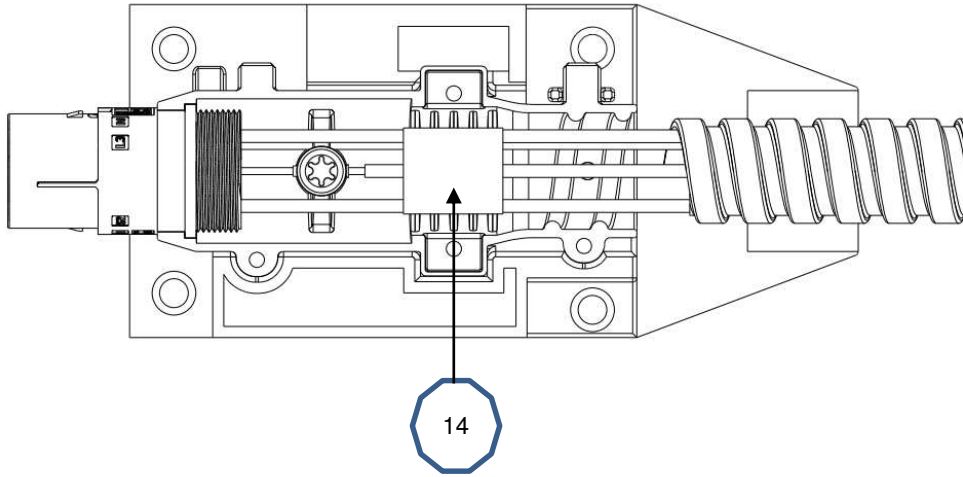


- Ensure the CPC with insulated bootlace ferrule has fed into the earth connection protrusion slot (see item 10).
- Use soft tool to push CPC to bottom of protrusion slot if required.

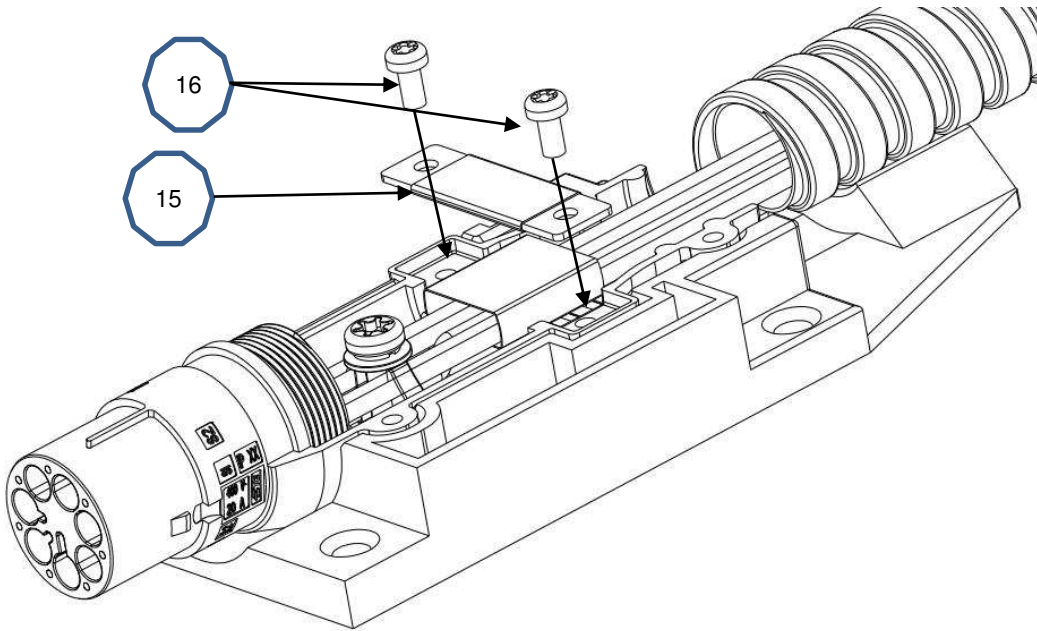
- Take M4 x 8mm self-tapping screw (item 11), M4 lock/spring washer (item 12) and M4 Plain washer (item 13) and assemble to earth protrusion tightening to maximum 1.2Nm. Ensure spring washer is fully compressed. This is to compress and hold the CPC (earth) to metal shell without damaging CPC conductors.



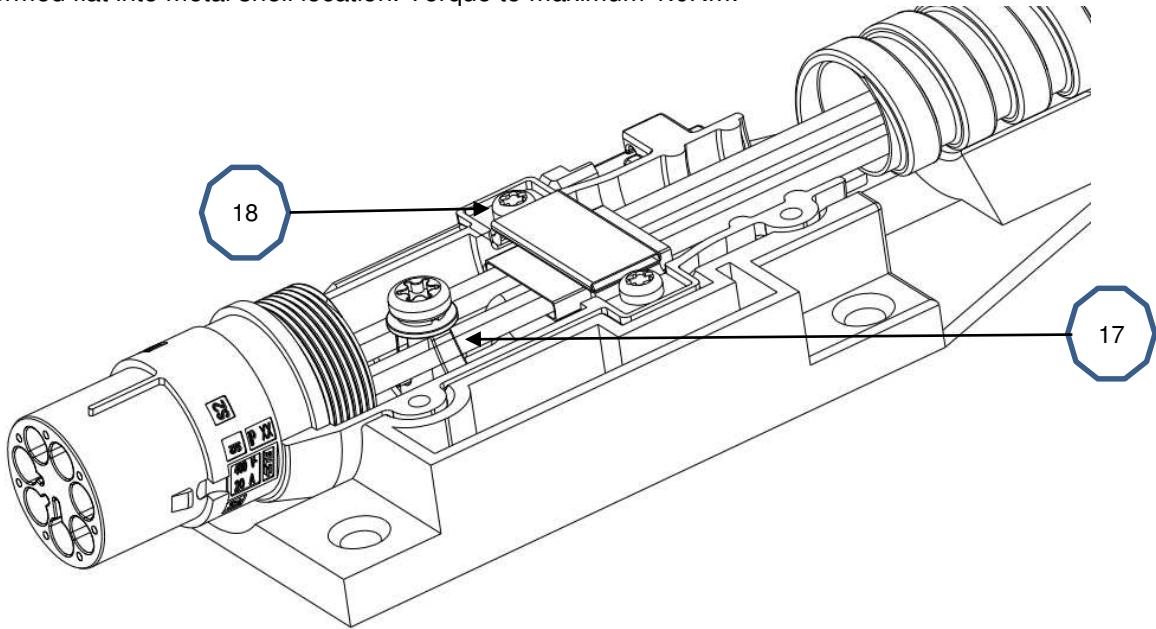
- Position the 18mm length of 15.32 diameter heat shrink (item 14) so it covers the ribs on the metal shell



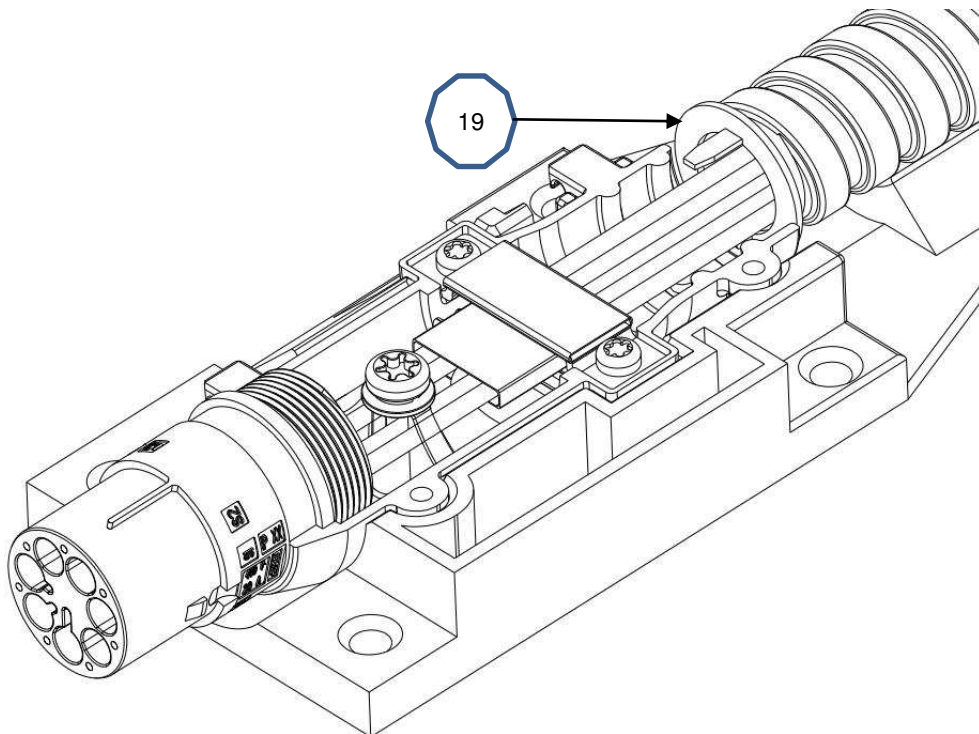
- Assemble fixing band with heatshrink tubing (item 15) with two M3 x 8mm self-tapping screws assemble (item 16).



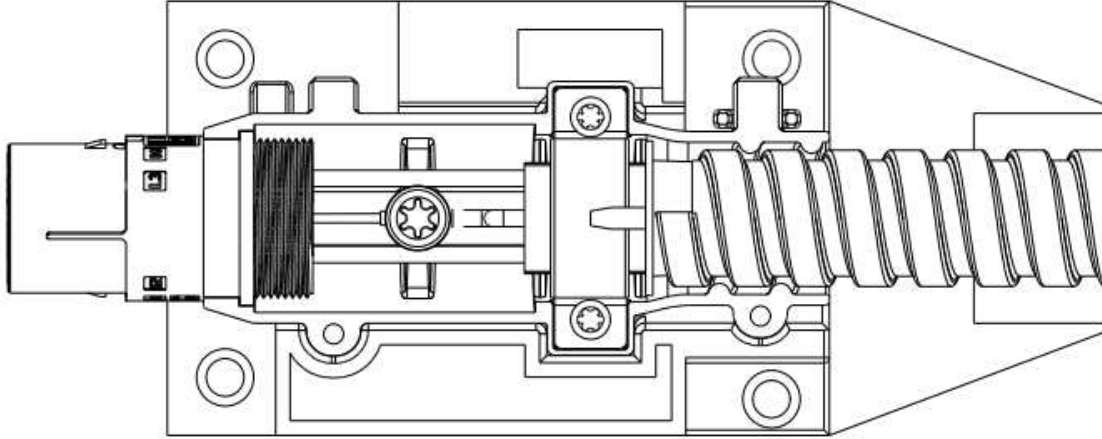
- Push wires onto metal ribbed area and in an evenly spread manner. You can assemble fixing band and then evenly spread wires if required. Ensure CPC is central to the wire bunch. If Non-CPC wires are in direct tight contact with CPC earth post outer supports move away using a non-sharp tool before securing fixing band (item 17).
- Tighten M3 screws evenly until fixing band deforms over wires (item 18). Fixing band will form into two outer area of metal shell and will sit flat against metal shell recess. Tighten M3 screws until band has formed flat into metal shell location. Torque to maximum 1.0Nm.



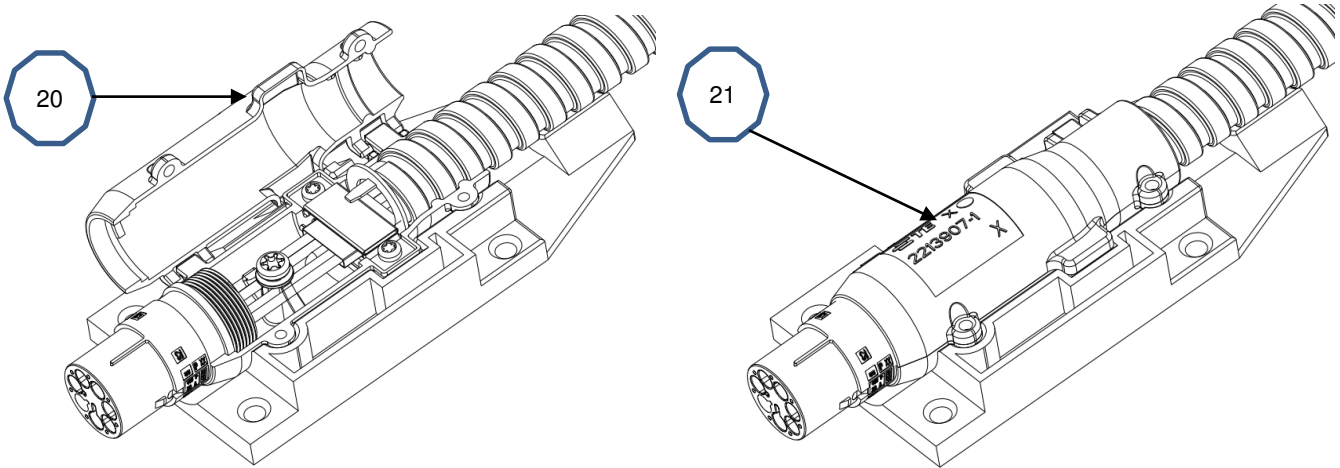
- Assemble No.2 bush to metal conduit (item 19).



- Align the metal clad conduit so it is within the metal shell final position. Make sure the metal conduit spiral is as far forward towards the fixing band as possible whilst allowing the metal conduit spiral geometry to sit into the opposite feature found on the metal shells.

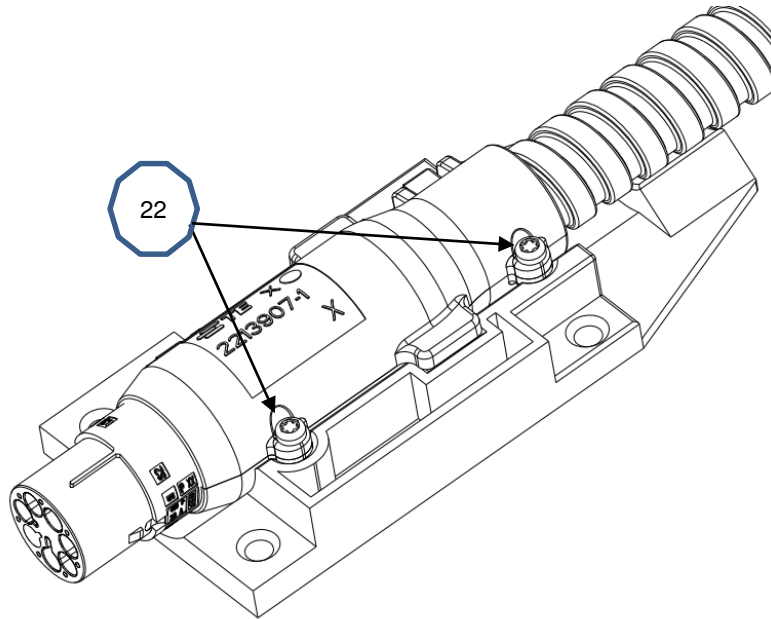


- Align top shell 2213907-1 (item 20) to assembly and rotate to semi-closed position (item 21).



- Using soft press (if required) compress shells together deforming the metal conduit. It is possible to compress shells by driving the M3 fasteners home.

- Take two M3 x 8mm self-tapping screws (item 22) and assemble to top shell. Screw M3 screws into the metal shells are fully closed. Maximum tightening torque to be 1.0Nm.
- Metal conduit to be secure and not rotate.



- Perform electrical testing between coupler earth pin and metal shell and metal conduit (use 10A source. Reading to be $\leq 50\text{m}\Omega$).
- Insulation test/flash test/resistance test between live/neutral wires and earth/metalwork.